

COLORADO RIVER RECOVERY PROGRAM
FY-2004–2006 PROPOSED SCOPE OF WORK
Colorado River smallmouth bass removal

Project #: 126

Lead Agency: Fish and Wildlife Service
Colorado River Fishery Project

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Date: 5 December 2003 (revised 13 February 2004)

Category:

- ☐ Ongoing project
- ☐ Ongoing-revised project
- ☒ Requested new project
- ☐ Unsolicited proposal

Expected Funding Source:

- ☒ Annual funds
- ☐ Capital funds
- ☐ Other (explain)

I. Title of Proposal: **Removal of Smallmouth Bass in the Upper Colorado River between Price-Stubbs Dam near Palisade, Colorado, and Westwater, Utah.**

II. Relationship to RIPRAP:

Colorado River Action Plan: Mainstem

- III. Reduce negative impacts of nonnative fishes and sportfish management activities.
- III.A. Develop and implement control programs in reaches of the Colorado River occupied by endangered fishes.

III. Study Background/Rationale and Hypotheses:

General

Significant anthropogenic changes to the physical riverine habitat have undoubtedly played an important role in the decline and endangered status of Colorado pikeminnow, humpback chub, bonytail, and razorback sucker, but changes in the biological environment may also have been equally significant. Physical changes in the riverine habitat have been accompanied by the introduction, establishment, and proliferation of nonnative fishes, and concomitant declines in native fishes in the upper Colorado River basin. The role of

nonnative fishes is often identified, in association with habitat changes, as a major obstacle to conservation of native fish communities.

At least 67 nonnative fishes have been introduced actively or passively into the Colorado River system during the last 100 years (Minckley 1982; Tyus et al. 1982; Carlson and Muth 1989; Minckley and Deacon 1991; Maddux et al. 1993). By 1980, more than 50 nonnative fishes had been actively introduced into rivers and reservoirs of the Colorado River basin (Minckley 1982; Tyus et al. 1982; Carlson and Muth 1989). Native big river fishes have disappeared from about three-fourths of their original habitat while introduced fishes have become more widespread and abundant. Former studies have also documented a decline in the abundance of native fish species as nonnative species increased in abundance (Joseph et al. 1977; Behnke 1980; Osmundson and Kaeding 1989; Quarterone 1993).

Many of the nonnative fishes introduced into the Colorado River basin are suspected of adversely affecting the native mainstem fishes in some fashion. Warmwater gamefish are thought to have the greatest adverse effect on endangered native fishes. Centrarchids (e. g., largemouth bass, green sunfish, bluegill, black crappie, and smallmouth bass), ictalurids (e. g., channel catfish and black bullhead), and esocids (northern pike) are frequently listed as contributors to the decline of native fishes. An increasing body of evidence characterizes the negative interactions of nonnative fishes with the endangered big river fishes (Hawkins and Nesler 1991; Minckley et al. 1991; Maddux et al. 1993; Lentsch et al. 1996). Some of this evidence is indirect, including inferences from field data or results from laboratory studies of predation by nonnatives on natives. Laboratory studies have documented agonistic behavior, resource sharing, and vulnerability to predation (Papoulias and Minckley 1990; Karp and Tyus 1990; Ruppert et al. 1993; Johnson et al. 1993). Direct evidence of predation includes native fishes obtained from stomach contents of nonnative fishes and by visual observation of predation. Other means by which nonnative fishes may adversely affect native fishes are by competition for food, which limits the success of razorback sucker (Papoulias and Minckley 1990). The extent of predation pressure by some nonnative fishes on populations of native fishes is not exactly known. Tyus and Saunders (1996) went on to conclude that smallmouth bass along with channel catfish and northern pike were the main threat to juvenile Colorado pikeminnow and razorback sucker.

Smallmouth Bass

Until 2003, smallmouth bass were only reported as incidental, rarely captured in the upper Colorado River from Price Stubb Dam (river mile 188.3) to the Colorado/Green River confluence. However, U.S. Fish and Wildlife Service sampling crews involved with the channel catfish removal evaluation recorded and documented the capture of 318 smallmouth bass in main channel riverine habitats in a 39-mile reach of the upper Colorado River from the Gunnison/Colorado River confluence to the Utah/Colorado stateline (Burdick 2003(a)). Catch rates (fish/hour and fish/mile) steadily increased throughout the 4-month sampling period (30 June to 31 October)(Table 1). The source(s) of these smallmouth bass is unknown.

Table 1. Number, catch effort (fish/hr and fish/mile) for largemouth bass and smallmouth bass collected from main channel habitats in the upper Colorado River with electrofishing from river mile 171.0 to 132.0 (Colorado/Gunnison River confluence to the Utah/Colorado stateline), 30 June to 31 October 2003. Note: data for the Upper Reach (Colorado/Gunnison River confluence to the Loma Boat Landing) and Lower Reach (Loma Boat Landing to the Colorado/Utah stateline) were combined. Total effort (hrs) = 26.78; total miles sampled = 42.9.

	<u>Largemouth Bass</u>			<u>Smallmouth Bass</u>		
	<u>No.</u>	<u>Fish/hr</u>	<u>Fish/Mile</u>	<u>No.</u>	<u>Fish/hr</u>	<u>Fish/Mile</u>
Pass 1	8	0.27	0.11	39	1.34	0.53
Pass 2	13	0.42	0.17	41	1.31	0.54
Pass 3	6	0.06	0.14	33	1.94	0.76
Pass 4	41	1.43	0.70	96	3.35	1.63
Pass 5	46	1.72	1.07	109	4.07	2.54
Totals	114	--	--	318	--	--

Upper Colorado River (Colorado)

In the upper Colorado River between Price-Stubb Dam (river mile [RM] 188.3) and the head of Westwater Canyon, (RM 125), abundance and distribution information for smallmouth bass is limited. However, the recent apparent increase in the numbers of smallmouth bass as reported during the channel catfish removal evaluation has biologists and managers concerned that smallmouth bass abundance may increase quickly, and further impact recovery of native endangered fishes. Smallmouth bass have the potential to predate or compete with different life stages of the four native endangered fishes.

Price-Stubb Dam presently acts as an effective upstream movement barrier for all fishes. Smallmouth bass are located in Rifle Gap Reservoir and adult smallmouth bass have been reported in the Colorado River between Rifle and Price-Stubb Dam (Anderson 1997). No

“naturally occurring” Colorado pikeminnow have been reported upstream of Price-Stubb Dam during fishery investigations over the past 23 years (Valdez et al. 1982; Wydoski 1994; Anderson 1997). The last wild razorback sucker captured upstream of Price-Stubb Dam was at RMs 205, 220.7, and 223.7 in 1980 and 1981 (Valdez et al. 1982). However, both wild and domestic-reared Colorado pikeminnow along with domestic-reared razorback sucker have been stocked in the Upper Colorado River upstream of Price-Stubb Dam between 1999 and 2001 (Burdick 2002).

Adult Colorado pikeminnow have been captured in the reach between Grand Valley Irrigation Diversion Dam (RM 185.3) and Price-Stubb Dam. Burdick (1999) collected 10 adult Colorado pikeminnow between 19 August and 24 September during 1998. Eight adult pikeminnow were collected between 29 April and 22 June 1999 and seven were collected in 2000 between 27 April and 19 May (personal communication, Douglas B. Osmundson). One radio-tagged Colorado pikeminnow was detected at the base of Price-Stubb Dam between mid-July and late-September in 1986 and 1987 (Osmundson and Kaeding 1989). Adult Colorado pikeminnow presently occupy the 15- and 18-mile reaches of the Colorado River in the Grand Valley and reaches downstream. Some of the last wild razorback sucker were captured in the 15-mile reach. Domestic-reared razorback sucker stocked near Parachute have been found in backwaters in the 15- and 18-mile reaches (Burdick 2002).

Lower Gunnison River

In the fish trap of the Redlands Dam fish passageway in the Lower Gunnison River, the number of smallmouth bass have recently increased (19 fish in 2002 and 2003)(Burdick 2003(a)) over previous years of monitoring (1996–2001: 1 fish)(Burdick 2001). About 1,800 fingerling smallmouth bass were stocked by the Colorado Division of Wildlife (CDOW) in 1973 in the Gunnison River near Delta (Wiltzius 1978) upstream from Redlands Diversion Dam. None of these stocked smallmouth bass have been subsequently captured upstream from the diversion dam (Wiltzius 1978, Valdez et al. 1982; Burdick 1995). Redlands Dam (RM 3.0) provides an effective barrier to smallmouth bass and all other fish attempting to move further upstream in the Gunnison River.

Control of Nonnative Fish by Mechanical Removal

Control of smallmouth bass and other nonnative fish species is a primary emphasis, along with habitat restoration, propagation and stocking, and instream flow management within the Recovery Program for the four endangered fish species. In the strategic plan for the control of nonnative fishes in the Upper Colorado River Basin (Tyus and Saunders 1996), “control” was defined as “reducing the numbers of one or more nonnative species to levels below which they are no longer an impediment to the recovery of endangered fish species.” The goal for nonnative fish control or management in the Upper Colorado River Basin is to reduce the adverse impacts of nonnative fishes on the endangered fishes which will hopefully increase the distribution and abundance of the endangered fishes and contribute to their recovery. It is not likely that nonnative fishes that have become established in the Upper

Colorado River Basin can be eliminated. However, preventive measures and active control programs could be implemented to reduce the abundance of nonnative fishes in riverine and adjacent floodplain habitats. Consequently, then, reducing the abundance of some problematic, nonnative fishes would reduce the potential for predation and competition on native listed and non-listed fishes. Management to promote recovery of listed fish species may have to include long-term or periodic suppression of some problematic nonnatives, such as mechanical removal, that minimizes impacts to remaining native fishes.

IV. Study Goals, Objectives, End Product:

Study Goals/Objectives

The purpose of this proposed study is to remove as many smallmouth bass of all sizes in main channel riverine habitats in a 61-mile reach of the Upper Colorado River between Price-Stubb Dam and Westwater boat landing in eastern Utah. The goal is to reduce the abundance of smallmouth bass as quickly as possible in this reach which will ultimately benefit native listed fishes, and possibly contribute to their recovery. The study objective is to:

1. remove all sizes of smallmouth bass in the Upper Colorado River by boat and raft-based electrofishing.

FINAL PRODUCT: Annual reports, November 2004, 2005.

- V. Study Area: sixty-one miles of the Upper Colorado River: Price-Stubb Dam downstream to Westwater boat landing (RM 188.3 – 127.6).

VI. Study Methods/Approach:

General

One of the conclusions agreed upon by participants at the December 2003 Nonnative Fish Control Workshop in Grand Junction was that smallmouth bass posed a greater threat to native fishes than other nonnative game fishes (e.g., channel catfish). Northern pike was viewed as the present number one threat to native fishes. At this workshop, the priority was established to start removing smallmouth bass from the Upper Colorado River in western Colorado as soon as possible to head off a possible increase in the abundance of this species. Recovery of listed native fishes might be more attainable if the threats (i.e., predation and competition) posed by certain nonnative fishes, such as smallmouth bass, could be minimized or eliminated.

Specific

This will be a 2-year study with annual reports at the end of each field season. The

second annual report will include a synthesis of all results. Sampling efforts will focus on a reach and not river-wide scale. For logistical considerations, the entire 61-mile section of the Upper Colorado River from Price-Stubb Dam to the Westwater, Utah, will be divided into three different sub-reaches based on hydro-geomorphic features.

Three general sub-reaches will be sampled in 2004 and 2005. These include, 1) a 3-mile section between Price-Stubb and Grand Valley Irrigation dams and the 15-mile section that extends from Palisade to the Gunnison/Colorado River confluence (RMs 185.5–171), 2) the 18-mile reach that extends from the confluence of the Gunnison and Colorado rivers to the Loma Boat Landing (RMs 171.0–152.6), and 3) Ruby and Horsethief canyons (RMs 152.6–127.6) which extends from the Loma Boat Landing to the Westwater, Utah. The 15- and 18-mile sub-reaches flow through a wide alluvial section of the lower Grand Valley; the canyon-bound sub-reach is considered a quasi-alluvial sub-reach. The number of sampling occasions (i.e., passes) in the 15-mile reach may be affected by the availability of sufficient water for sampling craft to operate due to extended drought conditions. Sampling the 3-mile section between Price-Stubb and Grand Valley Irrigation dams may be reduced due to poor access and low-water conditions in mid- to late-summer.

Each sub-reach will be sampled at least three times with electrofishing. The study will utilize jon boat and raft-based electrofishing to remove smallmouth bass. Main channel habitats will be targeted (e.g., shorelines and backwaters). Two electrofishing craft will be used concurrently to collect fish. Each electrofishing craft will be equipped with a Smith-Root (Model GPP 5.0) electrofishing unit. Actual time spent electrofishing (actual circuit time) will also be recorded. All smallmouth bass collected will be removed and sacrificed. All smallmouth bass collected will be provided to Pat Martinez of the Colorado Division of Wildlife for use in the stable-isotope study. Samples will be preserved according to criteria provided by CDOW.

All largemouth bass inadvertently collected in this study (netters will be unable to distinguish between smallmouth and largemouth bass until they are collected) will also be sacrificed and preserved for the stable isotope study. Additionally, Pat Martinez has requested that up to 100 channel catfish be sacrificed for the study. If authorized, they will also be sacrificed and preserved according to directions from CDOW. Other introduced nongame species (e.g. green sunfish or black bullhead) inadvertently collected will be sacrificed and disposed of in a manner that will not constitute a nuisance or as otherwise directed by CDOW.

All juvenile and adult endangered fish collected will be checked for a PIT tag, weighed, measured, and immediately returned to the river.

Data Analysis

All smallmouth bass captured within each of the sub-reaches will be enumerated. Total

numbers of channel catfish collected and catch per unit of effort will be determined for each sub-reach per sampling pass. Length data will be recorded to determine the size structure of smallmouth bass removed.

The annual reports will summarize the numbers of smallmouth bass captured by sub-reach, catch rates, and determine any changes in the mean individual size of smallmouth bass.

VII. Task Description and Schedule

Description

Task 1. Remove all sizes of smallmouth bass.

Task 2. a) analyze data; b) prepare annual RIP reports.

Schedule

Task 1. 7/2004–10/2004; 7/2005–10/2005

Task 2. 11/2004; 11/2005

VIII. FY-2004 Work (first year of 2-year study)

Deliverables/Due Dates:

Annual Report due 11/2004

Budget

Task 1

1. Labor (salary and benefits)

Project Leader (1-GS-14 @ 1,880)	2 weeks	\$ 3,760
Project Fishery Biologist (1-GS-11 @ 1,620)	14 weeks	\$ 22,680
Seasonal Technicians		
GS-5/6 @ 600 (3)	12 weeks	\$ 21,600
Administrative Asst. (1-GS-9 @ 1,225)	3 weeks	\$ 3,675
	Subtotal	\$ 51,715

2. Travel (per diem only)(field) (RP meetings/workshops)

1 week	\$ 525
	\$ 1,050
Subtotal	\$ 1,575

3. Equipment

Smith-Root, GPP-5.0 Electrofishing Unit (use as spare so crew can continue in case of breakdown)

(Control Box) w/ freight \$ 5,370

Gasoline, 2-cycle outboard oil for outboard motors;
props, jet-pump impellers, liners, parts \$ 1,600

Dip nets, holding tanks, small repair tools; stainless
steel spheres, cables, hardware \$ 500

Maintenance (Boat Motors, Generators, GPP's,
aluminum boat repair-welding) \$ 3,150

Office (paper, telephones, office supplies, computer
software, other misc.) \$ 1,200

Subtotal \$ 11,820

4. Vehicles (GSA-leased, FWS-owned: gas/tires/maintenance)

Fish Collections \$ 5,000

Subtotal \$ 5,000

Task 1 Subtotal \$ 70,170

Task 2

1. Labor (salary and benefits)

Project Fishery Biologist (1-GS-11 @ 1,620) 2 weeks \$ 3,240

Subtotal \$ 3,240

Task 2 Subtotal \$ 3,240

Tasks 1 & 2 Total \$ 73,350

FY-2005 Work (second year of 2-year study)

Deliverables/Due Dates:

Annual Report due 11/2005

Budget (5% inflation rate applied from 2004)

Task 1

1. Labor (salary and benefits)		
Project Leader (1-GS-14 @ 1,974)	2 weeks	\$ 3,948
Project Fishery Biologist (1-GS-11 @ 1,701)	14 weeks	\$ 23,814
Seasonal Technicians		
GS-5/6 @ 630 (3)	12 weeks	\$ 22,680
Administrative Asst. (1-GS-9 @ 1,287)	3 weeks	\$ 3,861
	Subtotal	\$ 54,303
2. Travel (per diem only)(field)	1 week	\$ 555
(RP meetings/workshops)		\$ 1,105
	Subtotal	\$ 1,660
3. Equipment (5 % inflation rate applied from FY-2004)		
Gasoline, 2-cycle outboard oil for outboards; props, jet-pump		
impellers, liners, parts		\$ 1,680
Maintenance (Boat Motors, Generators, GPP's,		
aluminum boat repair)		\$ 3,310
Office (paper, telephones, postage, office supplies,		
computer software/support, misc.)		\$ 1,260
Dip nets; stainless steel spheres, cable, hardware		\$ 790
	Subtotal	\$ 7,040
4. Vehicles (GSA-leased, FWS-owned: gas/tires/maintenance)		
(5 % inflation rate applied from FY-2004)		
Fish Collections		\$ 5,250
	Subtotal	\$ 5,250
Task 1		Subtotal \$ 68,253

Task 2

1. Labor (salary and benefits)

Project Fishery Biologist (1-GS-11 @ 1,701)	2 weeks	\$ 3,402
	Subtotal	\$ 3,402

Task 2 Subtotal	\$ 3,402
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Tasks 1 & 2 Total	\$ 71,655
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FY-2006 Work (wrap-up of 2-year study)

Deliverables/Due Dates: Annual Report/synthesis due 11/2005

Budget (5% inflation rate applied from FY-2005)

Task 2. Complete Annual report, including synthesis of FY 04 and FY 05 data.

1. Labor (salary and benefits)

Project Leader (1-GS-14 @ 2,073)	1 weeks	\$ 2,073
Project Fishery Biologist (1-GS-11 @ 1,786)	4 weeks	\$ 7,144
Administrative Asst. (1-GS-9 @ 1,351)	1 week	\$ 1,351
	Subtotal	\$ 10,568

2. Travel (per diem only)(5 % inflation rate applied from FY-2005)

(RIP meetings/workshops)	\$ 1,160
Subtotal	\$ 1,160

3. Equipment

Office (paper, telephones, postage, office supplies, computer software/support, misc.)	\$ 700
Subtotal	\$ 700

Total	\$ 12,428
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IX. Budget Summary

FY-2004	\$ 73,350
FY-2005	\$ 71,655
<u>FY-2006</u>	<u>\$ 12,428</u>
Grand	
Total:	\$157,433

X. Reviewers:

XI. References

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Prepared by Bob D. Burdick, 5 December 2003
Revised 23 January 2004, CWM.
Revised 13 February 2004, CWM
BOB\SOW\2004sow\smbass0405.wpd